United States Army
Logistics Transformation Agency

SBCT POE Demonstration and CLOE

Information Briefing

13 May 2003

Materiel Logistics Division
Logistics Transformation Agency
(717) 770-7600

The Bridge To CLOE

CLOE

- Integrating Platform, Information, and C3 Technologies to Accelerate the Transition to Objective Logistics Processes

EDAPS

- Synchronizing Programs within a Common Framework

CLOE Exercise

"Proof of Value" Operational Test

SBCT
"Proof of Enablers"
Technical
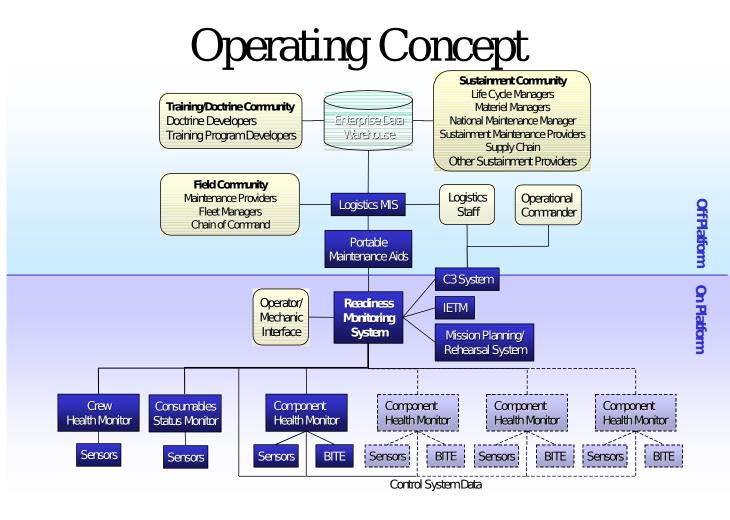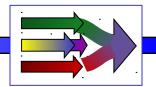Demonstration

- Synchronized people and organizations

- Established a common vision for condition based maintenance

- Integrated existing technologies into the common

Operating Concept

Training/Doctrine Community
Doctrine Developers
Training Program Developers

Enterprise Data Warehouse

Sustainment Community
Life Cycle Managers
Materiel Managers
National Maintenance Manager
Sustainment Maintenance Providers
Supply Chain
Other Sustainment Providers

Field Community
Maintenance Providers
Fleet Managers
Chain of Command

Logistics MIS

Logistics Staff

Operational Commander

Portable Maintenance Aids

C3 System

Operator/ Mechanic Interface

Readiness Monitoring System

IETM

Mission Planning/ Rehearsal System

Off Platform

On Platform

Crew Health Monitor

Consumables Status Monitor

Component Health Monitor

Component Health Monitor

Component Health Monitor

Component Health Monitor

Sensors

Sensors

Sensors | BITE

Sensors | BITE

Sensors | BITE

Sensors | BITE

Control System Data

SBCT POE Demonstration
(2nd QTR FY04)

Proof of Enablers!

- Doctrine & Business Process Update
  - **Condition-Based Maintenance**
  - **Integrated Supply Status**
- Technology Proof of Principle
  - **Embedded ED/EP Technology**
  - **Communications work-arounds**
- Synchronization
  - **TLDD**
  - **Embedded IETMs**
  - **Health Management**
  - **GCSS-A Interface**

STRYKER
HMMWV
HEMTT
FMTV

Path Forward

Work with FORSCOM to identify and enable a unit to… Collect data over time

Piggyback on existing rotation
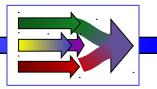
Proof of Value!

CLOE Exercise?

- A War Fighting Exercise at NTC with a platoon/company
- Controlled…enabled vs standard platforms

- Include Appropriate Weapon Systems and Tactical Wheeled Vehicles
- Assess Impact of Doctrinal Changes and Operational Benefits
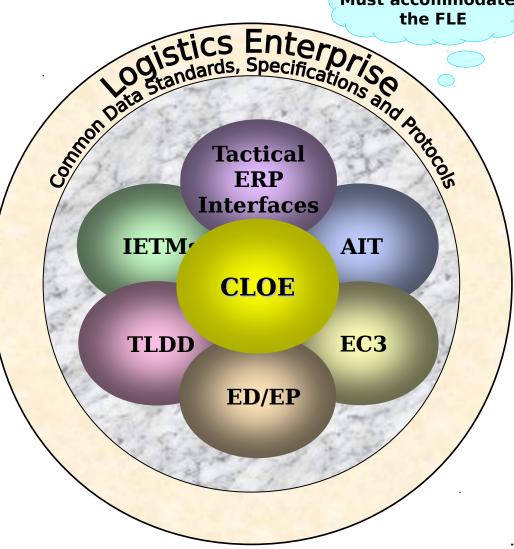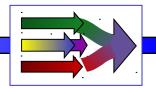
Sustaining The Transforming Army

CLOE's Integrating Vision

Must accommodate the FLE

- **Synchronized application of selected technologies**
  - **on all platforms in the interim force**
  - **automatically transmit timely logistics data.**

- **Makes Interim Force Support Doctrine Work**

- **Enables FCS to Interoperate with Legacy Systems**

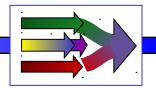- **Accelerates transition to Objective Force doctrine and technology.**

Logistics Enterprise
Common Data Standards, Specifications and Protocols

Tactical ERP Interfaces

IETM

AIT

CLOE

TLDD

EC3

ED/EP

Agenda

- **Purpose**

- **Scope**

- **SBCT Doctrine & Operational Concept Development**

  – **Operational Architecture**

  – **Health Management Process**

- **Maintainers Remote Logistics Network**

  – **Remote Diagnostics**

  – **Monitor on the Move**
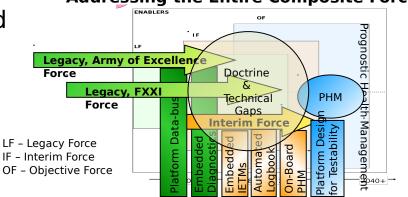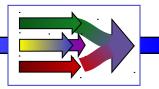
- **Program Management**

- **The Future – "CLOE"**

Purpose of the SBCT
POE Technical Demo

- **Amplify & Fix Doctrine & Technical Gaps for Predictive Maintenance/CBM to support the legacy fleet**

- **Demonstrate that the integration of Enablers works, technically**

- **Think beyond the SBCT to CLOE**
  - Establish the Doctrinal Basis For CLOE
  - Integrate FCS & non-FCS force support on the same battlefield

Addressing the Entire Composite Force Struct

ENABLERS

OF

IF

LF

Legacy, Army of Excellence Force

Legacy, FXXI Force

Doctrine & Technical Gaps

Interim Force

PHM

Prognostic Health Management

Platform Data-bus

Embedded Diagnostics

Embedded IETMs

Automated Logbook

On-Board PHM

Platform Design for Testability

LF – Legacy Force
IF – Interim Force
OF – Objective Force

2040+

Scope of Synchronization & Integration Efforts

Operational Concept Inputs
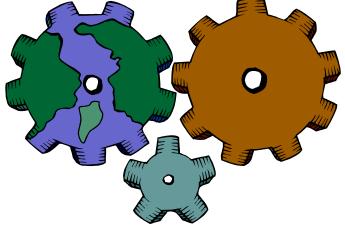
Synchronized Concepts

Platform/Maintenance
1. 2-Level Maintenance
2. Advanced/Combat Maintainer
3. ED/EP - Condition-Based/Predictive Maintenance

COMMS
4. Combat Power-Situational Understanding
5. MRLN

LOG
6. TLDD
7. Anticipatory Logistics
8. AIT

Integrated Development Projects

Platform Enablers
1. Health Check/PMM
2. Embedded IETM
3. Remote Diagnostics
4. DPMCS/Logbook
5. HMMWV Analog Conversions

COMMs Enablers
6. FBCB2 - Combat Power
7. MTS – Blue Force Tracking
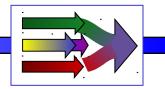
LOG Enablers
8. ETM-I
9. Monitor on the Move
10. AIT – Serial Number Tracking
11. GAISI

Doctrine/Policy
1. Force Structure
2. O&O/CSS FMs
3. Business Processes
4. AR 750-1
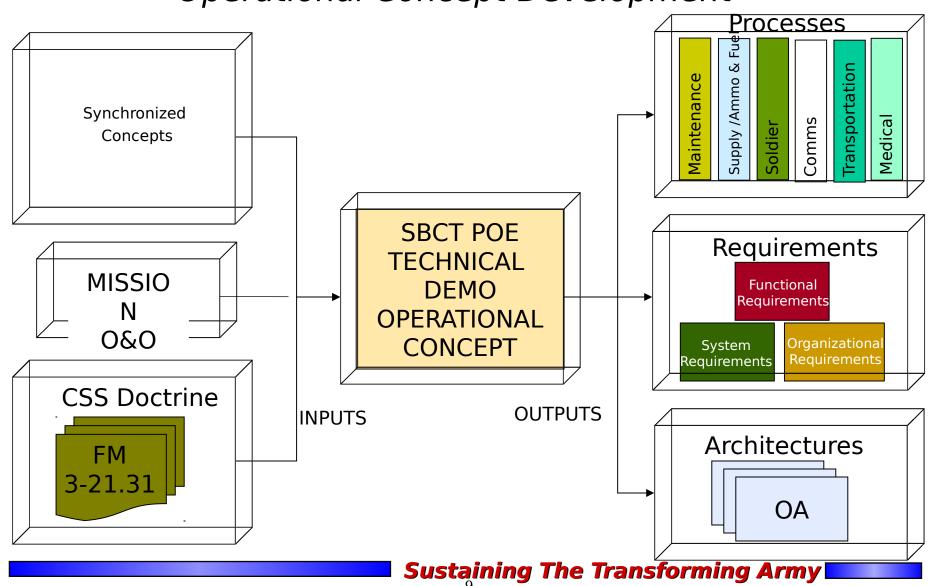
Training & IETM Updates Are Addressed TLLD Pilot Program

Sustaining The Transforming Army
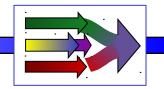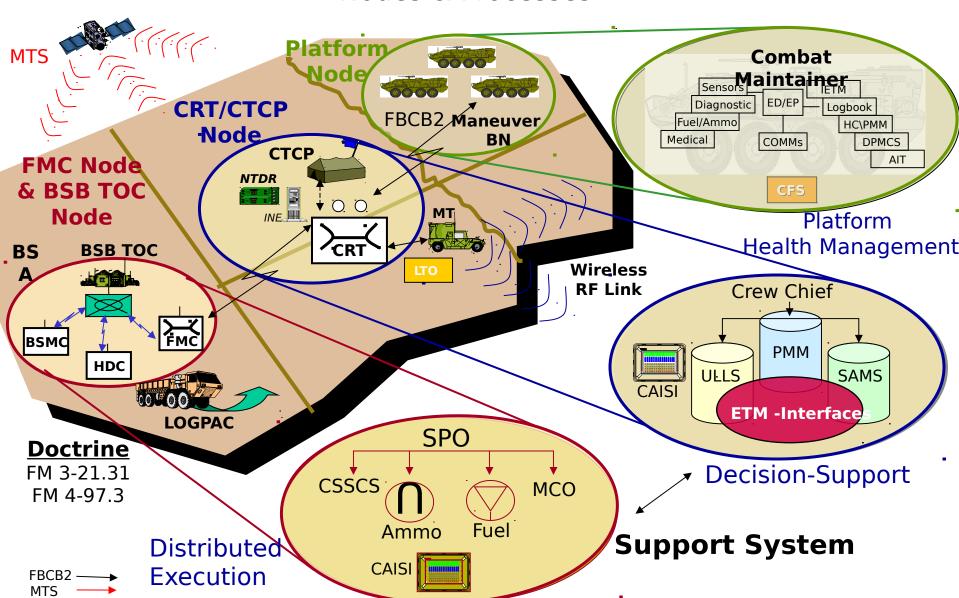
SBCT POE Demo
Operational Concept Development

Synchronized Concepts

MISSION O&O

CSS Doctrine

FM 3-21.31

INPUTS

SBCT POE TECHNICAL DEMO OPERATIONAL CONCEPT

OUTPUTS

Processes

Maintenance

Supply /Ammo & Fuel

Soldier

Comms

Transportation

Medical

Requirements

Functional Requirements

System Requirements

Organizational Requirements

Architectures

OA

MTS

Platform Node

FBCB2 **Maneuver BN**

CRT/CTCP Node

CTCP

NTDR

INE

CRT

MT

LTO

Combat Maintainer

Sensors
Diagnostic
Fuel/Ammo
Medical
ED/EP
COMMs
IETM
Logbook
HC\PMM
DPMCS
AIT

CFS

Platform
Health Management

FMC Node & BSB TOC Node

BSA

BSB TOC

BSMC

HDC

FMC

LOGPAC

Wireless RF Link

Crew Chief

CAISI

ULLS

PMM

SAMS

ETM -Interfaces

Decision-Support

Doctrine
FM 3-21.31
FM 4-97.3

SPO

CSSCS

Ammo

Fuel

MCO

CAISI

Support System

Distributed Execution

FBCB2 →
MTS →

Equipment Health Management Process

The Process from The Platform Node to The Support System Nodes

SUPPORT SYSTEM

PLATFORM

Platform Sensors → **On-Board Computing** → **COMM** →

BSB TOC **Distributed Logistic Support**

Trigger

CRT/CTCP **Decision Support**

1- Monitoring
- Crew Health Status
- Fuel/Ammo Status
- Diagnostic Status

2- Detection
- Trend & Fault
- Failure
- Diagnostic Support

3- Reporting
- Combat Power
- SITREP
- LOGSITREP
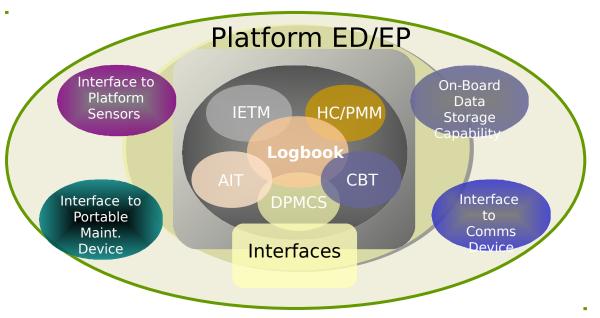
Embedded Health Management

"Platform Sensors" → "On-Board Computing" → COMMs "Alert Generation"

Synchronization & Integration of Platform Enablers

Platform ED/EP

- Interface to Platform Sensors
- IETM
- HC/PMM
- On-Board Data Storage Capability
- Logbook
- AIT
- CBT
- DPMCS
- Interfaces
- Interface to Portable Maint. Device
- Interface to Comms Device

Common Platform Picture

Drill Down Capability			
PLATFORM Level	Operationally Available	Warning or Caution	Limited Operation/ Dead-lined
Sub-System Level	Within limits	Anomaly or Fault Detected	Failure Detected
Component Level	Within limits	Predicted or Anticipated	Fault Isolation

Develop & Implement Platform Functionality that Addresses:

- Common Standards
- Common Applications
- Common Interfaces
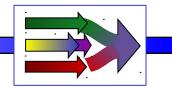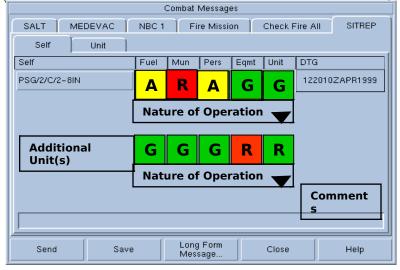
Alert Generation - COMMs

Synchronization & Integration of COMMs Enablers

COMMs "Alert Generation"

XML File Attached to MSG With Add Fault & Order Part Data

Common Messaging

Message Threads

PLT SGT   PLT LDR

CDR

1SG

Automated Rollup

CFS

CTCP

BSB TOC

SPO

AMMO	FUEL

Combat Messages

| SALT | MEDEVAC | NBC 1 | Fire Mission | Check Fire All | SITREP |

| Self | Unit |

Self	Fuel	Mun	Pers	Eqmt	Unit	DTG
PSG/2/C/2–8IN	A	R	A	G	G	122010ZAPR1999

Nature of Operation ▼

| Additional Unit(s) | G | G | G | R | R |

Nature of Operation ▼

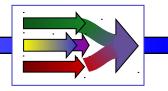Comments

| Send | Save | Long Form Message... | Close | Help |

Action ──▶ Automated ──▶
Information --▶
Source FM 3-21.31

Decision & Distributed Logistics Support

Synchronization & Integration of LOG Enablers & Legacy STAMIS

Integrate TLDD Products with other Enablers

- Mechanic's Interface to IETMs
- Mechanics Interface - Health Check
- Supervisor's Interface to Predictive Maintenance Module

Addresses

- Fuel
- Ammo
- Diagnostics
- Crew

BSB TOC Distributed Logistic Support

Trigger Log Action

CRT/CTCP Decision Support
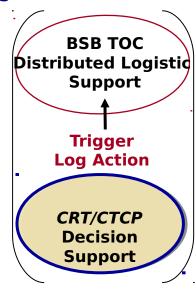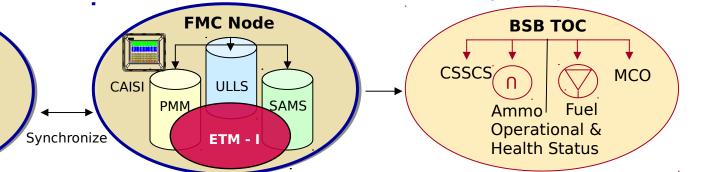
Predictive Maintenance

- Data Parser/3008
- Supervisors Interface
- At System Trend /Fault Analysis
- CBM/Predictions
- Maintenance Central

Common Logistics Operational Picture

CRT Node

CRT Crew Chief

CAISI   PMM   ULLS   SAMS

ETM - I

Synchronize

FMC Node

CAISI   PMM   ULLS   SAMS

ETM - I

BSB TOC

CSSCS   ∩   ▽   MCO

Ammo   Fuel

Ammo Operational & Health Status

Use of ULLS & SAMS Until GCSS-A/T ERP is Available

MRLN – Remote Diagnostics & Monitor on the Move

MTS

Platform Node

FBCB2

CRT/CTCP Node

CTCP

NTDR

INE

CRT

LTO

MT

FMC/BSB TOC Nodes

BSA

BSB TOC

BSMC

HDC

FMC

LOGPAC

Supports Workforce Reductions (66%)

Provides Technical Assistance Remotely to CM

Uses a Common Set of COMMS Interfaces & Common Test Manager

Remote Diagnostics

FBCB2 & MTS

IETM

CRT or FMC troubleshoots vehicle from remote location, fault isolates problem. Maintenance Team dispatched with required part & tools

Monitor on the Move

Maintenance Central

An Operational Snapshot of vehicle/unit status on demand. Used by CRT, FMC and SPO / BSB TOC in the Demo
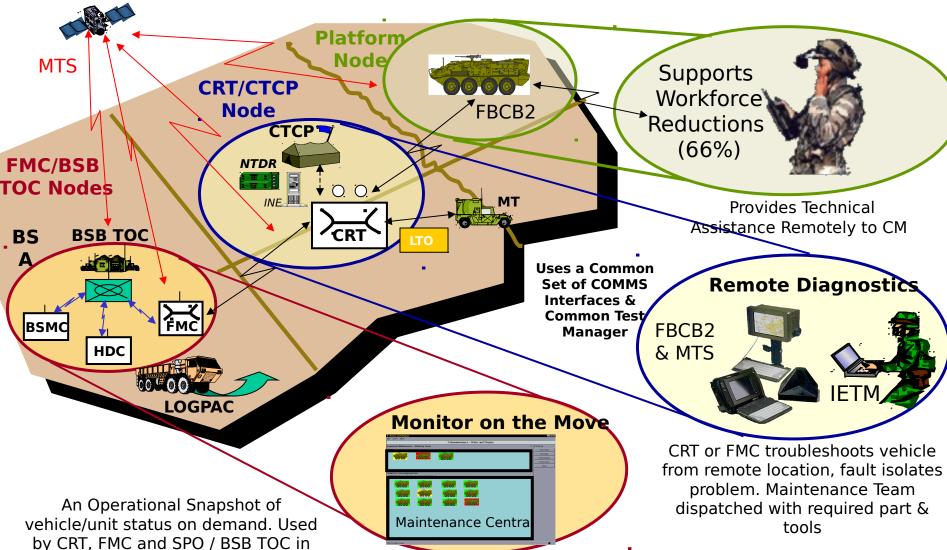
FBCB2 →
MTS →
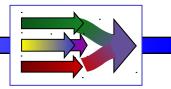
Note: Embedded Fault/Failure Isolation capabilities are based on vehicle design. All SBCT Platforms require man-in-the loop troubleshooting procedures using on-board IETM to conduct fault isolation.

Summary of SBCT POE Test/Demo
"Focus on Brigade and Below"

PLATFORM

SUPPORT SYSTEM

Platform ED/EP

Sensors | ED/EP | IETM
Diagnostic | | Logbook
Fuel/Ammo | COMMs | HC\PMM
Medical | | DPMCS

IETM · HC/PMM · **Logbook** · AIT · CBT · DPMCS · Interfaces

Alert

BSB TOC

CSSCS · MCO

Ammo · Fuel
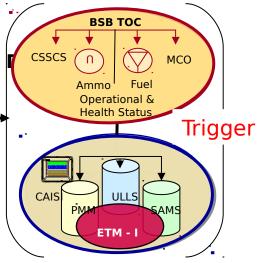Operational & Health Status

Trigger

CAIS · PMM · ULLS · SAMS · **ETM - I**

Synchronized Concepts

- Combat Maintainer Concept
- ED/EP Concept
- Predictive Maintenance Concept
- Combat Power Concept
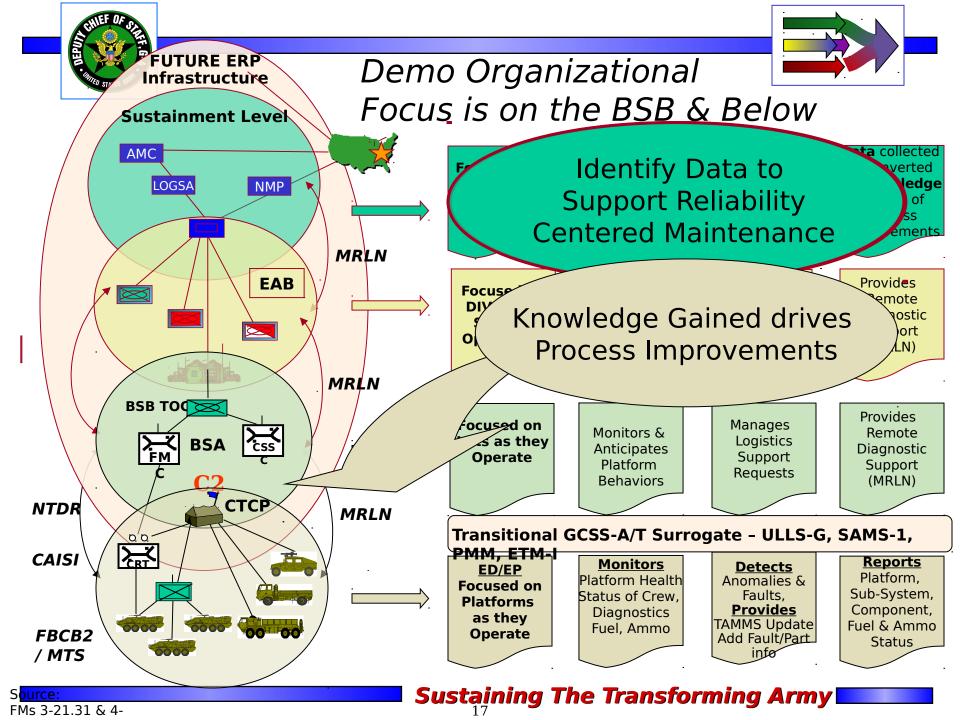- MRLN Concept
- TLDD Concept
- Two Level Maintenance Concept
- Anticipatory Logistics Concept

Leveraging Integrated Enablers to Provide
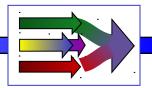
- Common Applications
- Common Interfaces
- Common Standards

Demo Organizational Focus is on the BSB & Below

FUTURE ERP Infrastructure

Sustainment Level

AMC

LOGSA

NMP

EAB

MRLN

MRLN

BSB TOC

BSA

FM

CSS

C

C

C2

CTCP

MRLN

NTDR

CAISI

CRT

FBCB2 / MTS

Identify Data to Support Reliability Centered Maintenance

Knowledge Gained drives Process Improvements

Data collected converted Knowledge of ess ements

Provides Remote nostic ort LN)

Focused on as they Operate

Monitors & Anticipates Platform Behaviors

Manages Logistics Support Requests

Provides Remote Diagnostic Support (MRLN)

Transitional GCSS-A/T Surrogate – ULLS-G, SAMS-1, PMM, ETM-I

ED/EP Focused on Platforms as they Operate

Monitors
Platform Health Status of Crew, Diagnostics Fuel, Ammo

Detects
Anomalies & Faults,
Provides
TAMMS Update Add Fault/Part info

Reports
Platform, Sub-System, Component, Fuel & Ammo Status

Sustaining The Transforming Army

Demo Project Milestones & Schedule

1st & 2nd QTRs FY03 Oct 02 – Mar 03	3rd – 4th QTRs FY 03 Apr – Sept 03	1st QTR FY04 Oct – Dec 03	2nd QTR FY04 Jan – Mar 04	3rd QTR FY04 Apr - Jun 04
Contract Awards ▼	Contract Awards (May-Jun) ▼		Platform COMMs LOG ▼	Integration Test Tech Test/Demo VIP Demo ◆

Project Management ➤ **System Development** ➤ **Mini-Integration Tests** ➤ **Technical Test & Demo** ➤

PDRs ▲   CDRs ▲   Development ▲   ▲ ▲ ▲   ▲ ▲   Close Out Report ◇

Operational Architecture Development - Demo CONOPS	System Architecture Development -Test Plans	Test Plans Facility Coord. Vehicle Config.	Lab Setups Scenario Dev Scripting & TNG Dev.	Test Facility Setup Conduct TNG	Conduct Test Freeze Baseline Transition to CLOE

Project Investments

PROCESS	PROJECT	FUNDED
PLATFORM • PM -TMDE • PM -BCT	HC/PMM Stryker HC	1,850,982 250,000
COMMS • PM-FBCB2 • TACOM – LIO • PM – MTS • TACOM LIO • TACOM LIO	Combat Power MRLN Interface MTS Messaging/Interface Incorporate Falconview MRLN System Engineering	250,000 625,000 30,000 28,600 232,000
LOGISTICS • PM-TLDD • TACOM LIO	CE to NT/2000 ETM-I & EMS	316,448 883,552
Technical Test/Demo • LIA	Integration, Test, Demo	579,000
TOTALS		**$5,045,582**

Technical Test & Demo - Conducted at Ft. Knox

TIMELINE			
DEVELOPMENT	1	2	3

1 - Integration Test (30 days)
   Integrate & Test All Systems & Interfaces

2 - Technical Test (30-45 days)
   - Health Management
   - COMM
   - LOG – ETM-I Functionality
   - TAMMS Automation
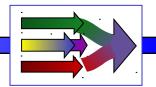
<u>Start of Test/Demo</u>

- Best Case March 04
- Worse Case June 04

3 - Demonstration for VIPs
   (2 Days)

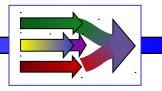*Sustaining The Transforming Army*

20

SBCT Demo Summary

We Have Already:

- Identified the Doctrinal Gaps and Templated the Fixes

- Brought all the government and contractors together to design a common vision

- Planned the schedule to build the program to be consistent with FCS and Objective Force planning

- Secured the cost estimates to develop the Systems Architecture within the project master schedule

Successful Completion will be based on:

- Meeting Cost & Schedule Milestones

- Establishing the technical basis for CBM and demonstrating that army doctrine for CBM works

- Influencing GCSS-A / ERP planning and support for CBM from retail through wholesale processes

- Providing the basis for the CLOE Proof-of-Value Exercise

Sustaining The Transforming Army

The Bridge To CLOE

CLOE

- Integrating Platform, Information, and C3 Technologies to Accelerate the Transition to Objective Logistics Processes
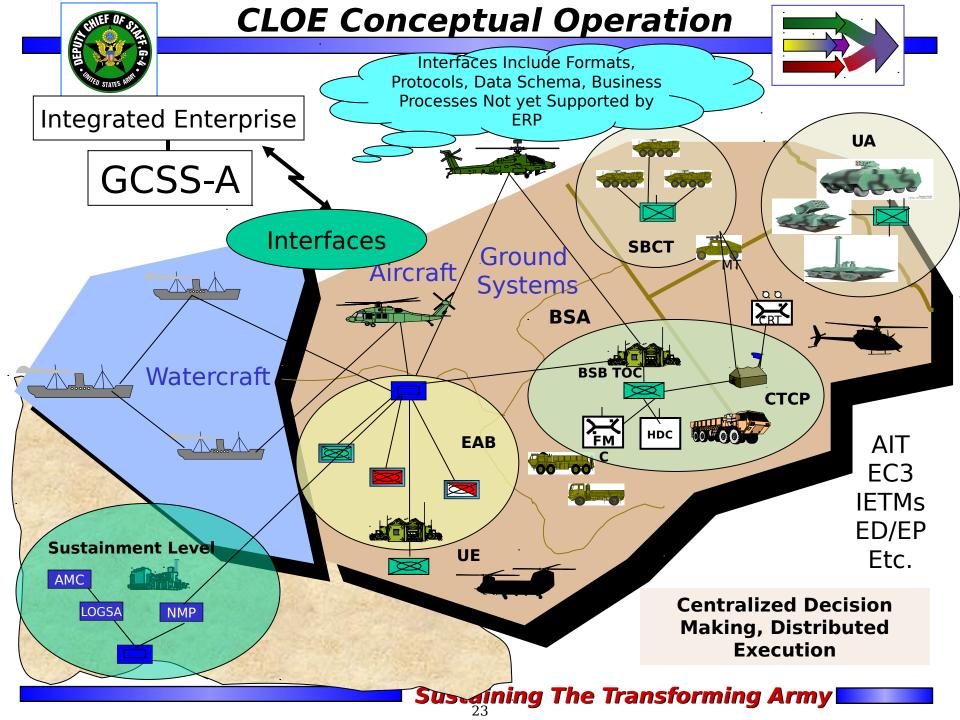
EDAPS

- Synchronizing Programs within a Common Framework

CLOE Exercise

"Proof of Value" Operational Test

SBCT
"Proof of Enablers"
Technical
Demonstration

CLOE Conceptual Operation

Integrated Enterprise

GCSS-A

Interfaces Include Formats, Protocols, Data Schema, Business Processes Not yet Supported by ERP

Interfaces

Aircraft

Ground Systems

UA

SBCT

MT

BSA

CRT

Watercraft

BSB TOC

CTCP

EAB

FM   HDC

C

Sustainment Level

AMC

LOGSA   NMP

UE

AIT
EC3
IETMs
ED/EP
Etc.

Centralized Decision Making, Distributed Execution
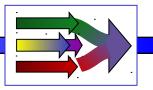
Sustaining The Transforming Army
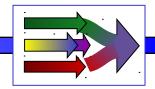
Why a CLOE Exercise?

General:

- **The concepts of CBM have been touted, but not tested**

  – **Not sufficient to establish technical proof of concept:**

  – **Technical demonstration establishes feasibility**

  – **Must test operationally, in a field environment with soldiers to establish value:**

    • **Operational benefit**

    • **Doctrinal validity**

    • **Cost- effectiveness**

Scale-up the SBCT Demo:

- **Expand to include all army stakeholders e.g.:**

  FCS, aviation, soldier systems

- **Link to ERP system, retail and wholesale**

- **Integrate FCS and non-FCS force sustainment on the same battlefield**

- **Provide opportunity to architect / select a cohesive software solution to legacy systems integration**
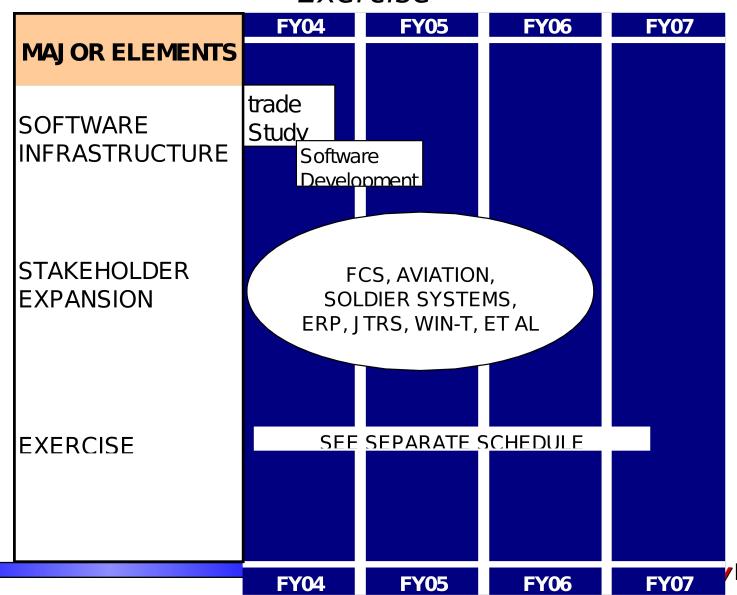
Bottom Line is to Establish Value

Key Differences

	SBCT OA	CLOE
Force Scope	**Legacy & Interim**	**FCS and Non-FCS**
Commodity Scope	**Ground Vehicles**	**All Equipment and Soldiers**
Supply System Scope	**ULLS & SAMS**	**GCSS-A & LMP ERP**
Users	**Brigade & Below**	**Full Spectrum**
Uses	**Tactical**	**Retail, Wholesale**
Data Interface to Log System	**Mil-Std-3008**	**SAP ERP / MIMOSA**
OTH Communications Media	**SINCGARS, MTS**	**JTRS, WIN-T**
Predictive Health Management	**PMM / Stryker ED**	**(+) LDSS / PSMRS**
Anticipatory Logistics	**SBCT OA**	**SAP ERP**
Doctrine & Business Practices	**SBCT OA**	**(+) FCS ORD; OF O&O**
Fielding Date	**2006**	**2008-2010***

- Incorporation of PHM functions into GCSS-A and WIN-T IOC pace CLOE schedule

Major Schedule Elements of Exercise

MAJOR ELEMENTS	FY04	FY05	FY06	FY07
SOFTWARE INFRASTRUCTURE	trade Study	Software Development		
STAKEHOLDER EXPANSION	FCS, AVIATION, SOLDIER SYSTEMS, ERP, JTRS, WIN-T, ET AL			
EXERCISE	SEE SEPARATE SCHEDULE			

FY04	FY05	FY06	FY07

Conclusions – Thoughts to Take Away

- The SBCT 'Proof of Enablers' Demonstration and the CLOE Experiment provide the bridge to the future of Platform Health Management.

- CLOE provides guidance to, and works with, the evolving maintenance & logistics support system, emerging doctrine & technology, and associated organizational processes for managing ED / EP in the army.

- CLOE will drive maintenance & logistics interoperability among Legacy, Interim and Objective Forces